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is taken by Lancaster as a fitting occasion for the preparation of a neat compendium of rain-records for all Belgium. The longer series, besides Brussels, are forty-three years at Ghent, thirty-five at Liège, twenty-three for Ostende, and twenty for Les Waleffes. The entire list, prepared for the end of 1882, contains one hundred and twenty-seven stations, with an average record of four and a half years; but of these, thirty-eight are for only one year, and sixty are for two years or less. At present the observatory receives the results attained at over two hundred stations. The chief general conclusions, which, unfortunately, are not shown either by map or diagram, are as follows: along the littoral lowlands an annual fall of about 650 millimetres, rising to a maximum in the highlands of the Ardennes (altitude about 400 metres) of from 900 to 1,100 millimetres. For 1882, rain and altitude of station are thus related:—

Below 10 m.	825 mm.	200 to 400 m.	1,220 mm.
10 to 100 "	875 "	400 to 700 "	1,375 "
100 to 200 "	1,020 "		

According to seasons, the ratios are, winter, 100; spring, 95; summer, 129; autumn, 119. Along the coast the maximum is in autumn: in the interior, it is in summer. Heavy rains occur chiefly in the summer. In Brussels, since 1833, there have been sixty-nine records of 25 to 50 millimetres of rain in a day, thirty-four of these being in June, July, and August. A general increase in the annual rainfall is suspected since 1865, the evidence being as follows:—

Ghent	1838-64, 753 mm.	Ghent	1865-82, 981 mm.
Brussels	1833-64, 700 "	Brussels	1865-82, 778 "
Liège	1847-64, 743 "	Liège	1865-82, 796 "

The sun-spot cycle does not find strong confirmation from the records at Brussels.

Minimum.		Maximum.		Difference.
1833	. . . . 646 mm.	1837	. . . . 714 mm.	68 mm.
1843	. . . . 736 "	1848	. . . . 750 "	14 "
1856	. . . . 670 "	1860	. . . . 695 "	25 "
1867	. . . . 682 "	1870	. . . . 737 "	55 "
1878	. . . . 818 "	1882	4 824 "	6 "

The little volume is chiefly valuable as bringing the older records up to time, and preparing for future work with the greatly increased number of stations of the past few years.

A NEW ASTRONOMICAL JOURNAL.

Bulletin astronomique, publié sous les auspices de l'Observatoire de Paris. Par M. F. TISSERAND. Tome i., No. i., Janvier. Paris, Gauthier-Villars, 1884. 64 p. 8°.

THE great number of new observatories in France now beginning active work has rendered a publication of this character a necessary adjunct of the labors of the astronomers of that country; and it will embrace two distinct parts, the first of which will contain the late observations made at the French observatories, ephemerides of planets and comets, and memoirs and notices relating to various topics in theoretical and practical astronomy. The second part is to be devoted to notices of current astronomical news, and a *résumé* of the chief periodical publications and of memoirs. This latter feature is a most fortunate one, and will make the *Bulletin* a desideratum in all observatories and scientific libraries. The special periodicals embraced in the *revue* of the January *Bulletin* are the *Monthly notices* of the Royal astronomical society, *The observatory*, the *Sidereal messenger*, the *American journal of science*, *Copernicus*, and the *Astronomische nachrichten*. The first part of the same number contains a brief paper by Tisserand, on the theory of the motion of the small planet Pallas, followed by observations of the satellites of Mars and Neptune by the Henrys, of the comet Pons-Brooks by Bigourdan and Perigaud, — all these at the Paris observatory, — and observations of the latter object by Trépied, at Alger; ephemerides of the small planets Mnemosyne, Diana, Alceme, and Parthenope; and is concluded with the first part of a paper by Schulhof and Bossert, on the late return of the comet of 1812. Appended to the January *Bulletin*, under the head of *Variétés*, are, a paper on *les phénomènes crépusculaires*, by Radau; the comets and planets of 1883, by Bigourdan; and the new observatory of Rio de la Plata.

It would be a matter of the greatest interest to those engaged in new and original research, if a department relating to unpublished investigations could be added to the *Bulletin*. Brief notes in such a department, relating to work already in hand, its progress at various stages, and to projected research, the material for which may be in process of accumulation only, would be likely to lead to a more effective and happy state of co-operation among astronomers and observatories than now exists.

The *Bulletin astronomique* is published from the press of Gauthier-Villars, and is gotten up in the attractive style, and with that good typo-

graphic taste, which characterize the house of this *imprimeur-libraire*; and, being under the immediate charge of so eminent and able an astronomer as Tisserand, we venture to predict for the new journal an auspicious future.

Tisserand will have as *collaborateurs* Callandreau and Bigourdan of the Paris observatory, and Radau; and the *Bulletin* is expected to be issued hereafter at the beginning of each month.

INTELLIGENCE FROM AMERICAN SCIENTIFIC STATIONS.

GOVERNMENT ORGANIZATIONS.

Geological survey.

Paleozoic paleontology. — During March the survey turned over to the National museum the collection of Devonian fossils from the Eureka district of Nevada. It embraces the Devonian fauna of central Nevada, described by Mr. Charles D. Walcott in the paleontology of the Eureka district, exclusive of the Actinozoa and Bryozoa. It contains 2,397 specimens, including 203 species, 89 of which are Brachiopoda, 44 Lamellibranchiata, 40 Gasteropoda, 11 Pteropoda, 9 Cephalopoda, 3 Crustacea, and 7 Poecilopoda.

During the last field-season, Mr. C. D. Walcott and his assistants spent some time in the study of the Potsdam localities in New York, and considerable collections were sent in to the office of the survey. He is now engaged in the preliminary preparation and study of material to illustrate the Cambrian fauna of the United States. It is very desirable that large quantities of material should be brought together from all the Cambrian groups; and the survey would be glad to receive collections, whether large or small, from all portions of the country. Care should be taken in packing, and a record kept. Correspondence has been begun with numerous collectors in Wisconsin, in order to obtain material from the Potsdam group.

Mesozoic paleontology. — Dr. C. A. White, in charge of this branch of paleontologic research, has lately prepared a bulletin on mesozoic fossils. It is illustrated with nine plates, and contains three papers devoted respectively to the mesozoic fossils of Alaska, Arkansas, and Texas. Hyatt's new genus, *Enclimatoceras*, is described and illustrated in this bulletin. The fourth annual report, which is just about being issued, contains a paper of sixty pages, with forty-nine plates of illustration, entitled "A review of the fossil Ostreidae of North America, and a comparison of the fossil with the living forms."

Dr. White is making preliminary studies of fossils from the Pacific coast, preparatory to visiting that section to undertake a special study of its mesozoic and cenozoic faunas.

At intervals ever since 1880, Dr. White has been engaged in the description of the mollusks and echinoderms of the cretaceous formation of the provinces of Sergiee, Pernambuco, Bahia, and Para, in Brazil. The collections were made by the Imperial geological survey of Brazil, in charge of Ch. Fred. Hartt. Dr. O. A. Derby, his former assistant, is in charge of the geological division of the National museum of

Brazil, under the auspices of which this work is done. The specimens described include 82 species of Chonchifera, 91 of Gasteropoda, 13 Cephalopoda, 11 of fresh-water faunas, and 15 echinoderms. Among them he has established four new genera. The specimens are all referable to the Neocomian series, as is also a fresh-water fauna from Bahia, described in the same volume. The manuscript, with twenty-eight quarto plates of illustration to be lithographed, is now ready for the printer, and will be published in Portuguese in the *Archivos* of the Brazilian national museum. It is expected that the descriptions, at least, will also be published in English. Dr. White finds that this cretaceous fauna is quite unlike any in North America, but more like that of southern India. A portion of the specimens have been identified with some described by Stoliczka in the 'Paleontologia Indica.'

Mr. J. B. Marcou, Dr. White's assistant, has been busily engaged in sorting and arranging the type specimens described by Prof. F. B. Meek in the various reports of Hayden, King, and other government publications. Many of the types of Conrad and Whitfield are also in the collections that he is arranging.

Mr. L. C. Johnson, who is in the same division, is arranging the large collections of fossils made by him in the Gulf states last summer, and is preparing geological sections from his notes taken while collecting these fossils.

Vertebrate paleontology. — Prof. O. C. Marsh, who is in charge of this division, reports progress in the preparation of the various memoirs, and states that field-work which began in April starts under good auspices, careful preparations having been completed to place four parties in the field early in the season, to be followed by others later.

Paleo-botany. — Among the collections of fossil plants made by Prof. L. F. Ward from the Fort-Union group in the upper Missouri and Yellowstone region, a number of new specimens have been found, which will eventually be published in Professor Ward's memoir on the subject. Professor Ward at present is engaged on the introduction to this work, in which he proposes to review the subject of paleobotany from the historical, geological, and biological stand-point. The work of figuring the types from the Fort-Union collections has been commenced, and a card-catalogue has been made of all the species of fossil plants in the National museum, which renders it much more available as an aid to research than it has ever been before.